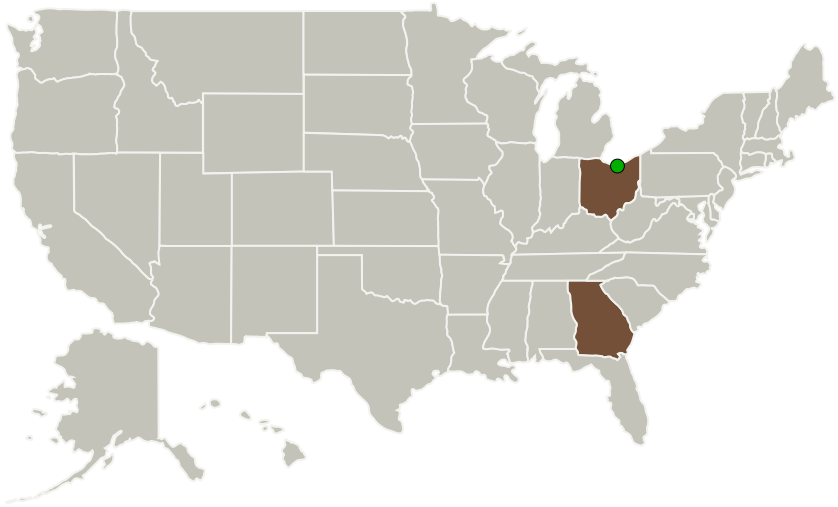
Durable Icephobic Cellulose Nanopaper Composite for Aircraft Icing Mitigation, Phase I

Completed Technology Project (2016 - 2016)

Project Introduction

Existing aircraft ice protection systems operate at the expense of other payload and add significant weight, power requirements, system complexity, or cost. A completely passive technology that would prevent ice accretion is highly desired, but no known technique has reached a level of effectiveness, durability and cost-efficiency to merit commercialization. Helicity Technologies proposes to integrate our proprietary icephobic liquid into a durable, easily renewable, environmentally friendly, icephobic composite that does not distort airflow and adds negligible weight. In Phase I, we will develop a cellulose nanopaper base layer for the storage and replenishment of our functional fluid to dramatically extend its useful life. Methods for increasing cellulose nanopaper strength and elasticity, and improved control of porosity will be explored. The resulting icephobic composite prototype will be tested for performance under simulated icing conditions in an icing wind tunnel.

Primary U.S. Work Locations and Key Partners



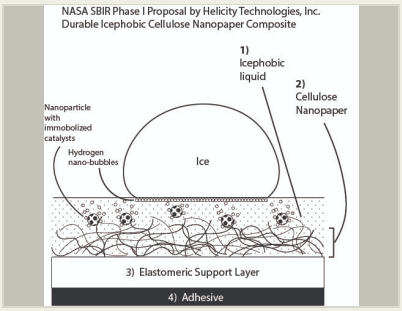


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Table of Contents

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Organizations Performing Work	Role	Type	Location
Helicity Technologies	Lead Organization	Industry Small Disadvantaged Business (SDB), Women-Owned Small Business (WOSB)	Acworth, Georgia
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Georgia	Ohio

Project Transitions

June 2016: Project Start

December 2016: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139948)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Helicity Technologies

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

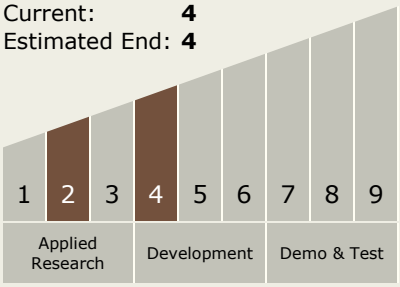
Carlos Torrez

Principal Investigator:

Liang Wang

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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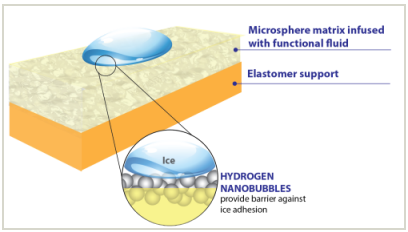
Images

Briefing Chart Image
Durable Icephobic Cellulose Nanopaper Composite for Aircraft Icing Mitigation, Phase I
(https://techport.nasa.gov/image/126590)



Final Summary Chart Image
Durable Icephobic Cellulose Nanopaper Composite for Aircraft Icing Mitigation, Phase I Project Image
(https://techport.nasa.gov/image/129501)

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.8 Ground and Flight Test Technologies

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System